EPA Region 7 TMDL Review

TMDL ID	326	*Water Body ID*	IA 04-RAC-02370-L
Water Body Name	Swan Lake		
Pollutant	Algae and Turbidity		
Tributary	unnamed (2)		
State	Iowa *HUC*	0710000701	
Basin	Raccoon River		
Submittal Date	11/15/2004		
Approved	yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

A letter dated November 12, 2004 and received by EPA November 15, 2004 formally submitted this TMDL for approval. A revised version of this TMDL was received December 1, 2004 by attachment to email.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

The Trophic State Index (TSI) was used to link the concentration of total phosphorus to the quantity of algae and turbidity in the system. A TSI for total phosphorus (TSITP) <70 was set as a target to achieve TSIs for chlorophyll (algae) and Secchi depth (turbidity) of <65. TSIs of <65 would meet the standard for algae and turbidity. The loading capacity for total phosphorus is set as a combination of reduction in internal and externally loaded phosphorus.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

Water quality standards and beneficial uses are described as well as applicable narrative criteria. Designated uses are A1 (primary contact recreation) and B (LW)(aquatic life). The standard is narrative and states the designated uses are hindered due to excess nutrient loading and impaired aesthetics. In 2002 the Class A use designation was assessed as "not supporting" due to the presence of aesthetically objectionable blooms of algae and presence of nuisance algal species. The Class B use was assessed as "partially supported."

Link Between Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

Even though there is a low TN:TP ratio in the lake phosphorus is targeted due to the predominance of blue-green algae in the plankton. Since these algae are capable of fixing atmospheric nitrogen, the most likely nutrient to limit their growth is phosphorus. The TMDL uses the surrogate measure of TSI which links phosphorus concentrations to algal and turbidity conditions. By reducing the TSI for total phosphorus to <70 the TSIs for chlorophyll and Secchi depth should be reduced to <65 based on the relationships seen in this lake. The minimum in-lake reduction in total phosphorus to meet this goal is 80% which should result in a reduction of 82% for chlorophyll and an increase in transparency of 250%.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

A major source of phosphorus loading is internal believed to be the result of resuspension of lake bed sediments by common carp. Because of this, the model used to calculate loading incorporates internal load into its results. Additional sources of phosphorus loads are watershed nonpoint sources including row crop agriculture, a resident Canada Goose population, septic systems and other wildlife. There are also two CAFOs in the watershed which have manure storage structures and spoils from previous lake dredging.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

Phase I of this TMDL is to reduce phosphorus loading to achieve an in-lake TSITP<70 resulting in TSIs for Secchi depth and chlorophyll of <65. This should be accomplished with a total phosphorus load allocation of from 150 pounds to 480 pounds per year depending on the relative contribution of internal vs. external phosphorus load.

WLA Comment

There are no significant point sources for phosphorus in the watershed. The WLA is set to zero.

LA Comment

The load allocation based on target TSITP<70 is on a sliding scale depending on what proportion of the load is internal versus external. With a zero internal load the load allocation is 480 pounds of phosphorus per year (all externally loaded). With a 90 pound internal load the total load allocation is 150 pounds per year (60 pounds are externally loaded). The TMDL uses a table to quantify load allocation based on varying internal and external loads.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The margin of safety is based on using a target in-lake concentration of total phosphorus 10% below the desired endpoint concentration. This target is an explained implicit MOS.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

The TMDL was based on annual phosphorus loading to attain growing season TSI targets.

Public Participation

Submital describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

Presentations were given to members of the Carroll County Conservation Board on June 9, 2004 and the Carroll County Soil and Water Conservation District on June 23, 2004. The draft TMDL was presented to the public in Carroll, Iowa October 12, 2004. The TMDL was posted on the IaDNR web site for public review. Comments received were reviewed and incorporated where appropriate.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

Follow-up monitoring will continue to meet, at a minimum, the minimum data requirements established by Iowa's 305(b) guidelines. An assessment will be completed by 2010 containing 3 lake samples per year for three years or 10 lake samples over a two year period.

Reasonable assurance

Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.

There are no waste loads allocated in this TMDL, there are no allowances for foreseeable increases in pollutant loads.